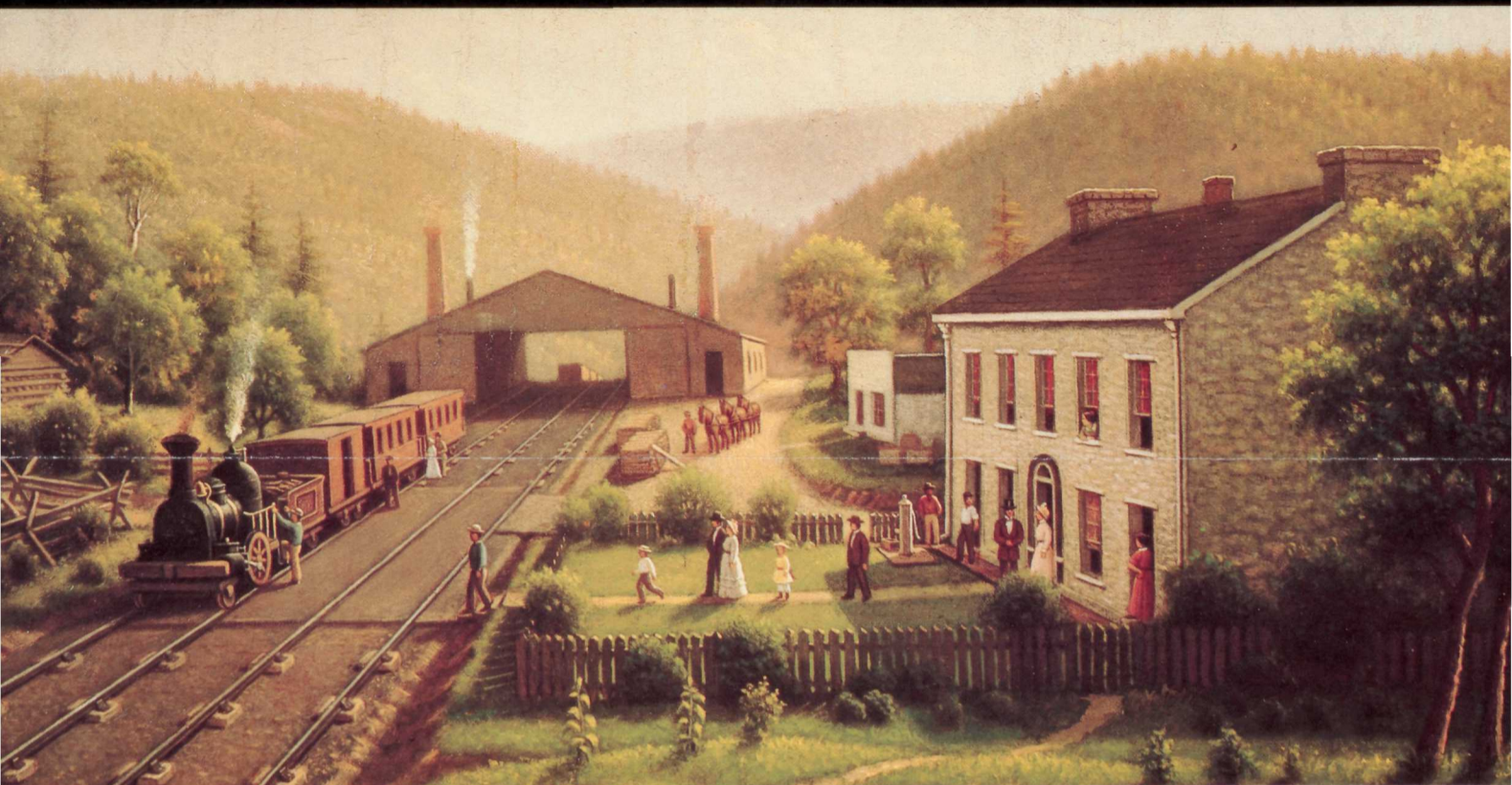


Allegheny Portage Railroad

National Historic Site
Pennsylvania
National Park Service
U.S. Department of the Interior



Lemon Inn on the Portage Railroad, by George Storm
Courtesy of The State Museum of Pennsylvania

Pushing A Nation Westward

The completion of the Erie Canal in 1825 was cause for celebration among the merchants of New York City, but the feat only discouraged their counterparts in Philadelphia. They watched helplessly as the trade that normally flowed through their city began to slip away, diverted through New York to take advantage of the western markets opened by the new canal. So in 1826 Pennsylvania's legislators authorized the Main Line canal system between Philadelphia and Pittsburgh, an ambitious plan requiring 276 miles of canal plus aqueducts, tunnels, reservoirs, dams, and 82 miles of railroad track. The daily loss of trade to New York loosened the state's purse strings and spurred construction, and by 1831 much of it was finished. But so concerned was everyone with pushing the eastern and western sections of the canal toward each other that no one had grappled with the greatest obstacle American canal builders had yet faced—the Allegheny Mountain range.

As workers on both canals approached the Alleghenies in March 1831, the legislature authorized a system in which canal boat passengers and goods would be moved to railroad cars and towed by stationary steam engines up a huge staircase of five inclined planes. On the descent they would be let down five more planes, then transferred again to canal boats. By late 1833, workers had

completed one track. The portage officially opened on March 18, 1834, and the first adventurous passengers were pulled up incline number one. The basic drawback of the system—the transfer from canal boat to railroad car—was eliminated in the mid-1830s by the development of sectional packet boats. These could be split into sections and loaded onto railroad cars for the portage, allowing passengers and freight to make the entire journey from Philadelphia to Pittsburgh on the same canal boat. Horses were initially used to tow the cars on the levels between inclines. They were dependable but slow, and soon were replaced on most levels by locomotives.

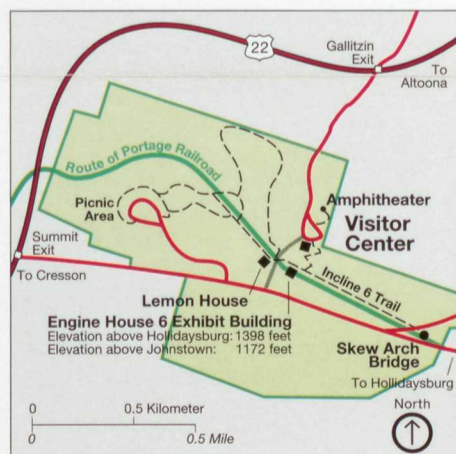
The portage railroad was a daring stroke of engineering that worked remarkably well during a time when railroads were still experimental. It was not without its problems, however. Boiler explosions endangered anyone near them. Heart-stopping breakages of the 3½-inch hemp tow ropes occurred all too frequently. That problem was solved when John Roebling suggested using the "wire rope" he was developing. By 1849, wire cable, later used by Roebling on the Brooklyn Bridge, was used on all planes.

Despite the new technology employed on the portage railroad, it was obsolete within a few years. As locomotives grew more powerful and dependable, railroads provided

stiffer competition for canals, finally putting most of them out of business. Moreover, inclines were slow and costly compared to continuous track. In the early 1850s the state began construction of a New Portage Railroad without inclined planes, spelling the imminent demise of the old portage. But the new portage was itself doomed before it was finished when the privately owned Pennsylvania Railroad completed its line over the Alleghenies in 1854. The canals, which froze over during the winter, could not compete with a carrier that offered faster, year-round rail service. The portage was abandoned after 23 years of service when the railroad bought the Main Line in 1857.

The canal system never captured enough western markets to live up to commercial expectations. Nevertheless, the Main Line was important to Pennsylvania, quickening trade between the coal-producing western towns and the eastern manufacturing cities. Its role in the country's westward expansion was perhaps its greatest contribution. Before the canal and portage were built, an arduous, weeks-long journey lay between emigrants from eastern farms and cities and the uncrowded west. The Main Line, decades before the first rails spanned the distance, gave settlers reasonably comfortable, routine transportation to their new homes.

Visitor Information



Allegheny Portage Railroad National Historic Site is administered by the National Park Service, U.S. Department of the Interior. A superintendent, whose address is P.O. Box 189, Cresson, PA 16630, is in charge. The site is located off U.S. 22, 12 miles west of Altoona. At the visitor center are exhibits and a film telling the story of the portage railroad. From there the visitor can follow a boardwalk through a stone quarry to Incline Plane 6. The Engine House 6 Exhibit Building preserves the remains of the original engine house founda-



tion. It also features a life-sized model of the stationary steam engine and exhibits on the railroad operation. The Lemon House on Cresson Summit (shown above and in painting) was built by Samuel Lemon about 1832 and served as his home, tavern, and business office. Other features include planes 6, 8, 9, and 10, stone culverts, stone railroad ties, Skew Arch Bridge, and Staple Bend Tunnel, the first railroad tunnel constructed in the United States. Visitors can follow interpretive trails along the summit level and incline 6. There

are picnic facilities near the Lemon House. Camping, hunting, open fires, and the removal of objects are prohibited.

Access. The visitor center, boardwalk, and Engine House 6 Exhibit Building are fully accessible. A wheelchair is available at the visitor center.

For Your Safety. Much of the portage railroad is now adjacent to or covered by busy highways. Be cautious when stopping along the way.

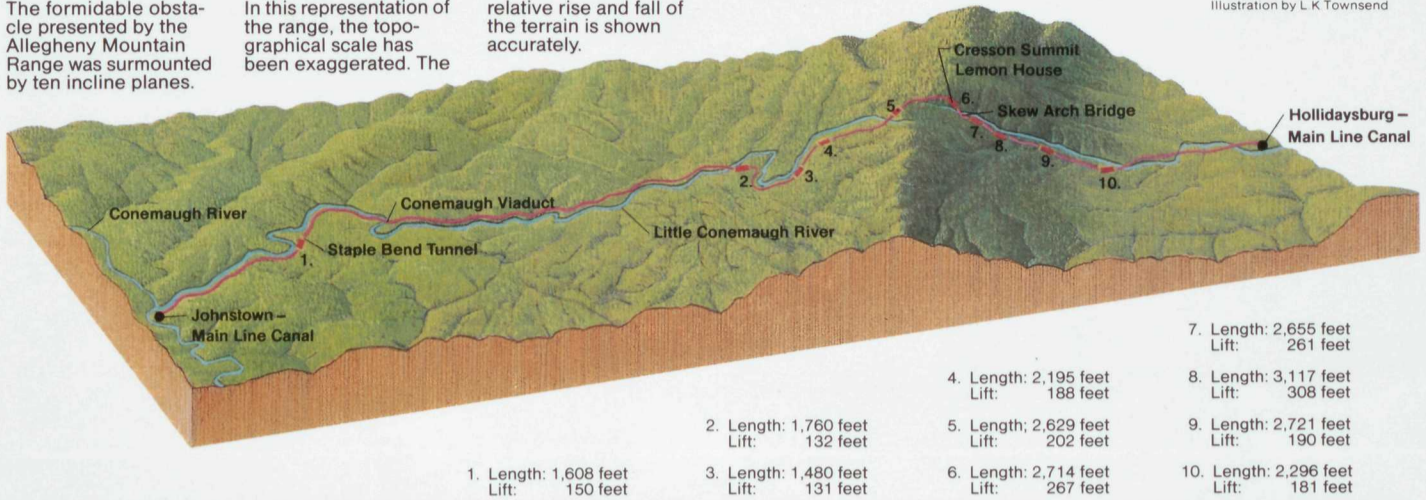
Crossing A Mountain

The formidable obstacle presented by the Allegheny Mountain Range was surmounted by ten incline planes.

In this representation of the range, the topographical scale has been exaggerated. The

relative rise and fall of the terrain is shown accurately.

Illustration by L.K. Townsend



How an Inclined Plane Worked

Illustration by L.K. Townsend based on a painting by George Storm.

The railroad portage over the Allegheny Mountains, though only a short section of the Pennsylvania Main Line, was crucial to the enterprise. It joined the system's two great canals into an efficient artery between eastern and western Pennsylvania. Passengers leaving Philadelphia in 1840 could reach Pittsburgh in 4 days instead of 23.

The engineering was simple in principle but bold in execution. In the canal basin at Hollidaysburg, the packet boat sections in which passengers had traveled from Philadelphia were floated onto railroad cars for the portage. They were hauled from the water by stationary steam engines, then pulled by locomotives at about 15 mph over the long grade to the first incline. In a small shed at the foot of the

incline, workers hitched three cars at a time, each with a load averaging 7,000 pounds, to the continuous cable that moved over rollers between the rails. This cable was pulled at about 4 mph by a stationary steam engine beneath a large shed at the top of the incline.

During the portage's busiest periods, six trains an hour were pulled up each incline. When possible, the operators used cars descending on the other track to counterbalance those ascending, lessening the strain on the engines. By today's standards, these were not particularly steep inclines, but they were too much for early locomotives. The steepest—number 8—had a slope of 9.9 percent (a 9.9-foot rise in 100 feet), or less than 6 degrees. The aver-

age incline rose about an inch every foot, easy enough for horses to pull up one car at a time if the engines broke down.

Five of these inclines carried the cars to the summit. On the near-level grades between inclines, the cars were drawn by horses or locomotives. The process was simply reversed on the other side of the summit, although gravity made the descent faster. Upon reaching the Johnstown canal basin, the boat sections were eased into the water, reassembled, and floated down the canal's Western Division to Pittsburgh. In 6 hours, the boats had traveled 36 miles, ascended 1,398 feet, and descended 1,172.

Sheds at the top of inclines housed twin 35-hp steam engines, used one at a time, with

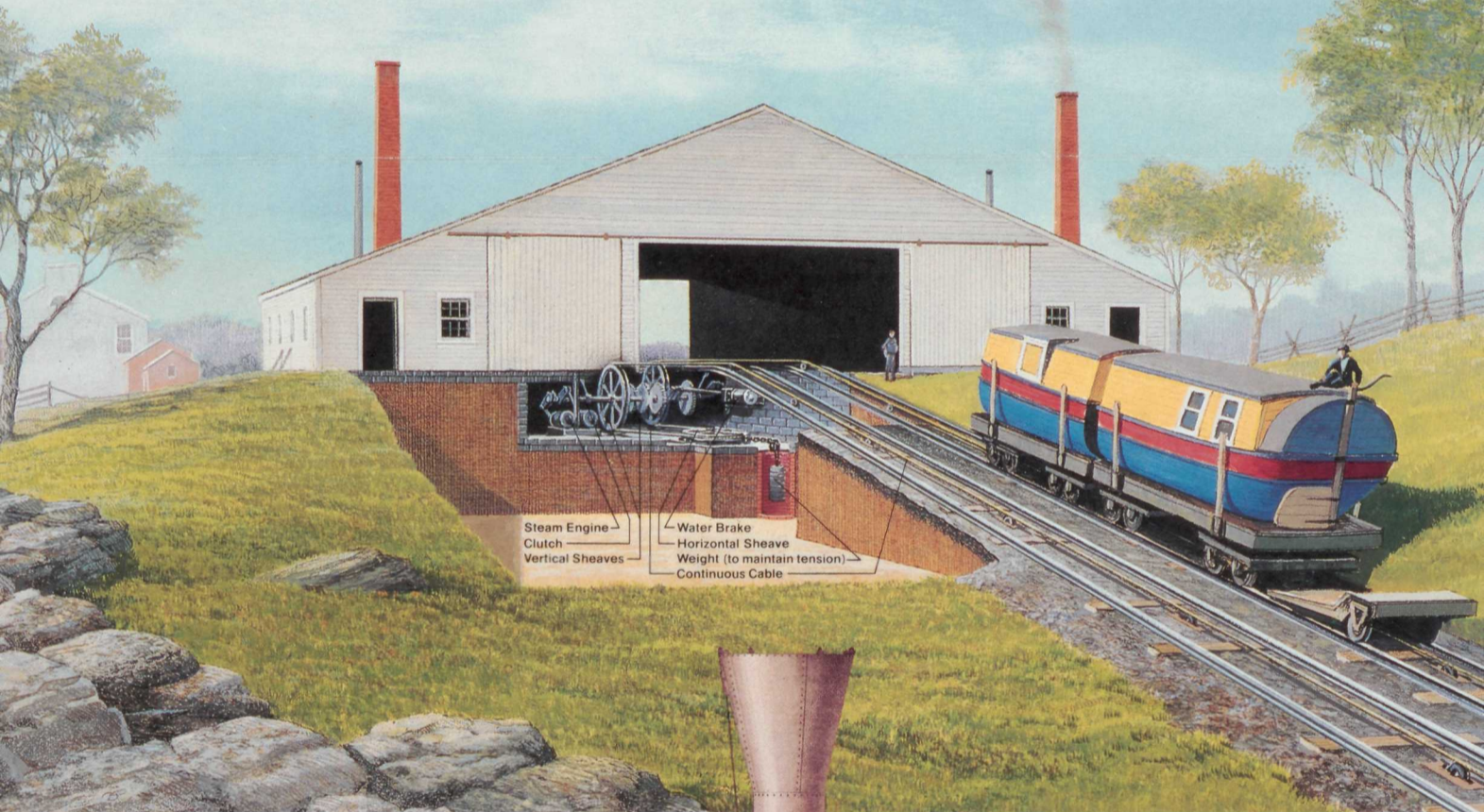
the other as backup. Each pulled the continuous cable that ran between the rails and

turned around vertical pulleys rotating in opposite directions beneath the shed floor. The

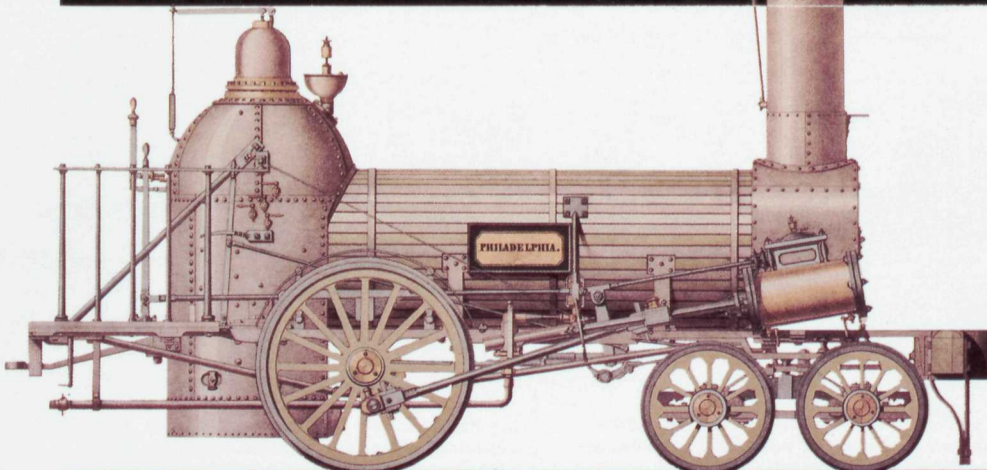
cable was kept taut by weighted horizontal pulleys. A water brake on the pulleys kept

descending cars from picking up too much speed. A spring-loaded friction brake car (visi-

ble behind burden cars) prevented cars from rolling downhill if a rope broke.



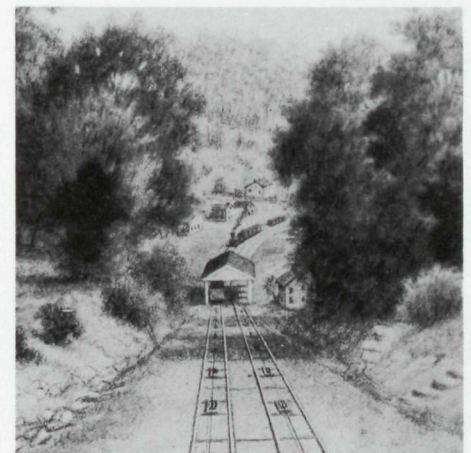
Other Sources of Power



Library of Congress

Locomotives like the Norris shown here or horses pulled cars on the levels between inclines. The long level between incline num-

ber 10 and Hollidaysburg was steep enough to allow cars to descend by gravity, with a locomotive used only to control speed.



This view of the portage railroad looks down incline Number 4. Cars descending an incline were attached to the cable and slowly eased

down. Their counterweight helped pull up cars ascending the parallel track.